REMARKS

In response to the Final Office Action mailed June 19, 2002, Applicant respectfully requests reconsideration. To further the prosecution of this application, Applicant has amended the claims and submits the following remarks.

Applicants respectfully request entry of this Amendment, which is believed to comply with 37 C.F.R. § 1.116. Admission of the amendments made herein is believed to be proper as the amendments comply with requirements of form set forth in the Office Action and/or present the rejected claims in better form for consideration on appeal.

Applicants have corrected minor typographical and grammatical errors not noted in the Final Office Action by amending the specification. Furthermore, Applicants have amended some of the claims, not for any substantial reason related to patentability, but rather solely to correct grammatical errors and address minor informalities not noted in the Final Office Action. With the exception the amendment to claim 13, which was amended pursuant to the rejection in the Final Office Action under 35 U.S.C. §112, second paragraph, the amendments to the claims herein are not intended to narrow the scope of any recited element. Claims 21-23 have been amended to correct minor typographical errors, without changing the scope thereof.

Claims 1-31 are pending in the application, of which 1, 11, 21, and 25 are independent claims. Claims 1-31 stand rejected. Claim 13 has been amended herein. The application as presented is believed to be in allowable condition.

I. Rejection under 35 U.S.C. §112, First Paragraph

a. Written Description Requirement

In ¶2 of the Final Office Action, claims 1-31 are rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection.

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail so that one skilled in the art can reasonably conclude that

the inventor had possession of the claimed invention. According to MPEP § 2163: "Factors to be considered in determining whether there is sufficient evidence of possession include the level of skill and knowledge in the art, partial structure, physical and/or chemical properties, functional characteristics alone or coupled with a known or disclosed correlation between structure and function, and the method of making the claimed invention. Disclosure of any combination of such identifying characteristics that distinguish the claimed invention from other materials and would lead one of skill in the art to the conclusion that the applicant was in possession of the claimed species is sufficient." See Regents of the University of California v. Eli Lilly, 119 F.3d at 1568, 43 USPQ2d at 1406.

Applicant respectfully submits that the present application discloses functional characteristics and a correlation between structure and function sufficient to provide written description support for the "coating system of layers" recited in claims 1 and 11. For example, the Examiner is directed to page 7, line 29 – page 8, line 19 and page 9, lines 3-17, which describe functional characteristics of the "coating system of layers" and a relationship between these characteristics and disclosed structure.

Further, according to MPEP § 2163: "Possession may be shown in a variety of ways including description of an actual reduction to practice... An application specification may show actual reduction to practice by describing testing of the claimed invention... ." See, e.g., Pfaff v. Wells Electronics, Inc., 525 U.S. 55, 68, 119 S.Ct. 304, 312, 48 USPQ2d 1641, 1647 (1998).

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Applicant respectfully submits that the present application describes an actual reduction to practice by describing testing, which is sufficient to provide written description support for the "coating system of layers" recited in claims 1 and 11. For example, the Examiner is directed to Figs. 4-6 and the accompanying description on pages 8-9, which describe tests performed during the reduction to practice of the invention.

For at least the foregoing reasons, Applicant believes the specification satisfies the written description requirement set forth in 35 U.S.C. §112, first paragraph. Accordingly, withdrawal of the rejection of claims 1-31 under 35 U.S.C. §112, first paragraph, is respectfully requested.

b. Other Issues

The Final Office Action also states, in connection with the rejection under 35 U.S.C. §112, first paragraph, that "Applicant claims 'the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers' where there is no previous disclosure of evaporation in the claim." Initially, Applicant notes that the Examiner appears to articulate a concern relating to the language of the claim(s), rather than the written description of the specification. Thus, Applicant is unclear as to the implications of the Examiner's assertion with respect to 35 U.S.C. §112, first paragraph.

However, Applicant notes that the phrase to which the Examiner refers (see, e.g., claim 1) is stated in its entirety as follows: "a coating system of layers having a thermal conductivity that maintains the coating system of layers *at a temperature that does not cause more evaporation* during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere *than absent the read and write operations*." (Emphasis added) As is evident in the above phrase, the reference to "more evaporation" is made with respect to a state "absent the read and write operations." Thus, to the extent that Applicant has properly understood the Examiner's concern to be a perceived ambiguity in the claim language, it is believed that the phrase "more evaporation" is unambiguous in view of the phrase "absent the read and write operations."

II. Rejection under 35 U.S.C. §112, Second Paragraph

In ¶4 of the Final Office Action, claim 13 is rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended claim 13 to overcome the rejection by deleting the word "substantially," objected to by the Examiner. Accordingly, withdrawal of this rejection is respectfully requested.

III. Rejection under 35 U.S.C. §103(a) over Buckingham in view of Rosen

In ¶6 of the Final Office Action, claims 1-3, 5-6, 8 and 10 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 5,168,031 ("Buckingham") in view of U.S. Patent No. 5,761,188 ("Rosen"). This rejection is respectfully traversed.

The Final Office Action refers to the rejection set forth in the Office Action mailed October 3, 2001. That Office Action states that Buckingham teaches "the conventionality of air incidence and the recording layer and the recording layer ablated by an air incident modulated laser beam." The Office Action concedes that "Buckingham does not disclose a low thermal conductivity of a dielectric layer or protective layer." However, the Office Action alleges that this feature is taught by Rosen, which discloses a dielectric layer with a low thermal conductivity that acts as a protective layer so that the high temperature experienced by the recording layer does not deform the substrate (Col. 7, lines 15-19; Col. 8, lines 23-27). No such teaching of Rosen can be extracted or applied to the structure of Buckingham to make the present invention, as discussed below.

a. Summary of Buckingham

Buckingham discloses an optical recording element having a recording layer that includes a class of phthalocyanine dyes that absorb at near-infrared lengths (Col. 1, lines 5-10). The optical recording element may have an air-incident construction (AI) or a substrate-incident construction (SI), the latter being the "current trend" in the optical recording industry, according to Buckingham (Col. 1, line 64 – Col. 2, line 11).

b. Summary of Rosen

Rosen discloses an optical disk 12 having two substrates 50 and 56, located on opposite faces of the optical disk 12 (Col. 3, lines 49-51; Fig. 5). Light from a laser beam is directed at the disk 12 and is incident on the outer face 49 adjacent substrate 50 (Col. 3, lines 51-52; Fig. 5). In a preferred embodiment, the substrate 50 is 0.6 mm (600 μm) thick (Col. 3, lines 58-59).

The optical disk 12 of Rosen is a *substrate-incident* disk. As described in Applicant's specification, in substrate-incident optical recording, the active layer of a disk is separated from

the lens by a thick plastic substrate (Page 1, line 31 – Page 2, line 3). Light is transmitted through the substrate, which is typically 0.6 to 1.2 mm (600 to 1,200 μm) thick, and one or more dielectric cladding layers before reaching the active layer of a substrate-incident optical disk (Page 6, lines 2-5; Fig. 1).

What - reasons

For a number of reasons, substrate-incident disks do not promote optical lens contamination, one problem addressed by the claimed invention. First, due to the thickness of the substrate, the surface of the substrate where light enters the substrate-incident optical disk is well-insulated from thermal events occurring at the active layer, where the light used to read and write the disk is focused (Specification at Page 6, lines 7-9). Further, because substrate-incident disks have a greater distance between the surface of the disk and the active layer, the "spot-size" of the light at the surface of the disk is larger in a substrate-incident disk than an air-incident disk. Hence, the optical energy density impinging on the disk surface is far less in a substrate-incident disk than in an air-incident disk, substantially reducing evaporation. Additionally, substrate-incident disk systems use a greater lens-to-disk distance than do air-incident disk systems. Since the lens-to-disk distance in substrate-incident disk systems is greater, even if there was evaporation of contaminates from the surface of a substrate-incident disk, transport to and condensation or deposition on an associated lens does not occur.

As noted in Applicant's specification, substrate-incident disks, such as the optical disk 12 disclosed in Rosen, are admitted prior art to the claimed invention (e.g., Page 5, lines 19-20). Also, as evidenced by the above discussion, as well as the discussion in the instant application, there are structural differences between air-incident disks and substrate-incident disks making features and teachings in one field inapplicable to the other.

c. The Stated Basis for Combining Buckingham and Rosen is Improper

According to the Office Action, "Buckingham teaches the conventionality of air incidence and the recording layer ablated by an air-incident modulated laser beam." The Office Action further states that "[i]t would have been obvious to one of ordinary skill in the art to include the low thermal conductive properties of Rosen in the dielectric and protective layers of

Buckingham because Rosen teaches that giving layers high thermal conductivity for heat dissipation purposes is known in the art."

It is respectfully asserted that the combination of Buckingham and Rosen in the manner suggested in the Office Action is improper, as the disclosures in these references specifically teach away from the described combination. Therefore, the Office Action fails to set forth a proper motivation to combine the references and, hence, fails to set forth a *prima facie* case of obviousness (see MPEP § 2143).

As noted in the Office Action, Rosen teaches a substrate-incident disk having a dielectric layer 51, which acts as a protective layer so that the high temperature that the recording layer 53 experiences during writing and erasing does not deform the substrate 50, onto which laser light is incident (Rosen at Col. 7, lines 18 and 6-19). In an air-incident disk there is no substrate on the light-incident surface of the disk. Therefore, there would be no motivation to modify an air-incident disk, such as that disclosed in Rosen, to include a layer such as dielectric layer 51 that protects a substrate from deformation. Even if the only teaching taken from Rosen is to use an insulating dielectric over the recording layer, there is no motivation to use an insulating dielectric absent either a need to prevent deformation of a substrate, which cannot exist for an air-incident medium like Buckingham, or the motivation that can only be obtained from the instant application by improper use of hindsight. Moreover, there is no suggestion to use the substrate of Rosen in the structure of Buckingham because doing so would render Buckingham inoperative as an air-incident medium.

As should be appreciated from the foregoing, rather than suggesting their combinability in the manner suggested in the Office Action, Buckingham and Rosen specifically teach away from such a combination. Thus, it is respectfully asserted that the rejection of claims 1-3, 5-6, 8 and 10 over a combination of Buckingham and Rosen is improper, and should be withdrawn.

d. Claim 1

Claim 1 recites an air-incident optical recording medium compatible with a flying optical head. The air-incident optical recording medium comprises a recording layer sensitive to modulation and readout by an optical beam directed through the flying optical head. The air-

incident optical recording medium further comprises a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations. The coating system of layers includes a first dielectric layer disposed on the recording layer and a protective overcoat layer disposed on the first dielectric layer.

Even if one were to combine the teachings of Buckingham and Rosen, the result would be a substrate-incident disk, as disclosed in Buckingham, including the dielectric layer 51 of Rosen. However, this combination of Buckingham and Rosen does not teach or suggest an air-incident optical recording medium comprising a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations, including a first dielectric layer and a protective overcoat. Although not in dispute, the recitation of "air-incident optical recording medium" in the preamble must be considered because it defines structural features of the claimed invention and, pursuant to MPEP §2111.02, "any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation." Because the structures and teachings of Rosen related to substrate-incident media are totally incompatible with air-incident media, no combination of Buckingham and Rosen can teach or suggest the invention recited in claim 1.

Furthermore, neither Rosen nor Buckingham discloses any system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations, as each of Rosen and Buckingham is directed to a problem unrelated to the evaporation of contaminates from an optical recording disk, and therefore does not teach or suggest a related solution.

In view of the foregoing, it is respectfully asserted that claim 1 patentably distinguishes over any combination of Buckingham and Rosen, such that the rejection of claim 1 under 35 U.S.C. §103(a) as being obvious over Buckingham in view of Rosen should be withdrawn.

Claims 2-3, 5-6, 8 and 10 depend from claim 1 and are patentable over Buckingham and Rosen for at least the same reasons.

IV. Rejection under 35 U.S.C. §103(a) over Rosen in view of Lee

In ¶7 of the Final Office Action, claims 1-5, 7, and 9-31 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 5,761,188 ("Rosen") in view of U.S. Patent No. 5,729,393 ("Lee"). This rejection is respectfully traversed.

The Final Office Action refers to the rejection set forth in the Office Action mailed October 3, 2001. That Office Action appears to rely on Rosen for all features in the claims related to "an air-incident optical disk" (as recited in independent claims 11 and 21) or "an air-incident optical recording medium" (as recited in independent claims 1 and 25), and on Lee for features related to "a flying optical head" (as recited in independent claim 21).

a. No motivation to combine Rosen and Lee

Initially, Applicant respectfully submits that there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings of Rosen and Lee. Accordingly a *prima facie* case of obviousness has not been established (see MPEP § 2143).

Lee is directed to a flying head assembly, including a solid immersion lens (SIL), for use with an optical recording disk (Col. 1, lines 19-41 of Lee). Lee discloses that an SIL is positioned very close to the recording layer on a disk to achieve a high numerical aperture (Col. 1, lines 35-41). Rosen, on the other hand, is directed a substrate-incident optical disk, as discussed in section IIIa. As discussed in section IIIb, a substrate-incident disk, such as that disclosed in Rosen, is not sensitive to modulation and readout by an optical beam directed through a flying optical head. Thus, one would not have been motivated to combine the teachings of Lee and Rosen because the flying head assembly of Lee is unsuitable for use with

the substrate-incident disk of Rosen and therefore could not be used with the substrate-incident disk of Rosen in an optical system.

Because there is no suggestion or motivation to combine the teachings of Rosen and Lee, Applicant respectfully asserts that the Final Office Action has failed to establish a *prima facie* case of obviousness. Accordingly, the rejection of claims 1-5, 7, and 9-31 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn. Further, as will be discussed below, neither Rosen nor Lee, alone or in combination, discloses, teaches, or suggests all of Applicant's claimed features. For this additional reason, the Final Office Action fails to set forth a *prima facie* case of obviousness, and the rejection of claims 1-5, 7, and 9-31 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn.

b. Claim 1

Claim 1 recites an air-incident optical recording medium compatible with a flying optical head. The air-incident optical recording medium comprises a recording layer sensitive to modulation and readout by an optical beam directed through the flying optical head. The air-incident optical recording medium further comprises a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations. The coating system of layers includes a first dielectric layer disposed on the recording layer and a protective overcoat layer disposed on the first dielectric layer.

As discussed in section IIIa, Rosen teaches a substrate-incident optical recording medium, rather than an air-incident optical recording medium as recited in claim 1. While Lee refers to the fact that an optical disk may be used with the disclosed optical flying head, Lee is completely silent with respect to specific features of the optical disk and, in particular, with respect to any discussion of layers or the thermal conductivity thereof. Therefore, no combination of Rosen and Lee teaches or suggests an air-incident optical recording medium comprising a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write

operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations, as recited in claim 1.

Further, as discussed previously, even if the sole teaching extracted from Rosen is that a thick substrate layer has insulative properties, the prior art of record would still not suggest the claimed invention. A layer of the thickness of the substrate described in Rosen would not be useable in an air-incident recording medium between the flying optical head and the active layer because it would separate the head too far from the active layer for the system to operate correctly, as explained above. Hence, there is no teaching in Rosen of providing optical disk layers that are suitable for use in an air-incident medium, while still providing the claimed thermal properties.

In view of the foregoing, it is respectfully asserted that claim 1 patentably distinguishes over any combination of Rosen and Lee, such that the rejection of claim 1 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn.

Claims 2-5, 7, and 9-10 depend from claim 1 and are patentable over Rosen and Lee for at least the same reasons.

c. Claim 11

Claim 11 recites an air-incident optical disk compatible with a flying optical head. The air-incident optical disk comprises a phase change recording layer where the reflectivity difference between the amorphous and crystalline states are utilized for mark formation. The air-incident optical disk further comprises a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of molecules adsorbed therein from an ambient atmosphere than absent the read and write operations. The coating system of layers includes a first dielectric layer and a protective overcoat layer.

For the reasons set forth in section IVb, no combination of Rosen and Lee teaches or suggests an air-incident optical disk comprising a coating system of layers having a thermal conductivity that maintains the coating system of layers at a temperature that does not cause more evaporation during read and write operations of the coating system of layers and of

molecules adsorbed therein from an ambient atmosphere than absent the read and write operations, as recited in claim 11.

In view of the foregoing, it is respectfully asserted that claim 11 patentably distinguishes over any combination of Rosen and Lee, such that the rejection of claim 11 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn.

Claims 12-20 depend from claim 11 and are patentable over Rosen and Lee for at least the same reasons.

d. Claim 21

Claim 21 recites an optical recording system. The system comprises an air-incident optical disk compatible with flying optical heads, in which a recording layer is separated from a surface of the disk by intervening layers of a total thickness less than about 1 μm and a composition such that the highest temperature of the surface during normal operation is less than the desorption temperature of water. The system further comprises a flying optical head where the lowest facet of the lens element of the flying optical head is supported to float in close proximity to the surface of the disk and where the optical focus of the flying head is at the recording layer. The system also comprises means of delivering a beam of light to the optical head so as to raise the recording layer to a temperature exceeding about 250°C, means of optically detecting and differentiating the presence and absence of the mark as seen by the optical beam, and tracking detection and feedback means to ensure that the optical beam can follow the path of the marks.

As discussed in section IIIa, Rosen teaches a substrate-incident optical recording medium having a substrate with a thickness of approximately 600μm, rather than an air-incident optical recording disk in which a recording layer is separated from a surface of the disk by intervening layers of a total thickness less than about 1 μm, as recited in claim 21. While Lee refers to the fact that an optical disk may be used with the disclosed optical flying head, Lee is completely silent with respect to specific features of the optical disk and, in particular, with respect to any discussion of layers or the composition thereof. Therefore, no combination of Rosen and Lee teaches or suggests an air-incident optical disk in which a recording layer is separated from a

surface of the disk by intervening layers of a total thickness less than about 1 μm and a composition such that the highest temperature of the surface during normal operation is less than the desorption temperature of water, as recited in claim 21.

In view of the foregoing, it is respectfully asserted that claim 21 patentably distinguishes over any combination of Rosen and Lee, such that the rejection of claim 21 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn.

Claims 22-24 depend from claim 21 and are patentable over Rosen and Lee for at least the same reasons.

e. Claim 25

Claim 25 recites an air-incident optical recording medium which can be used with a flying optical head. The recording medium includes a recording layer sensitive to heat produced by an optical beam which raises the recording layer to a temperature exceeding 250°C. The air-incident optical recording medium comprises a coating system less than 1 μm thick on the recording layer, between the recording layer and the flying optical head, the coating system having at least one layer whose thermal conductivity prevents a surface temperature from occurring when the recording layer is heated by the optical beam which can cause evaporation of molecules adsorbed therein from an ambient atmosphere.

As discussed in section IIIa, Rosen teaches a substrate-incident optical recording medium having a substrate with a thickness of approximately 600μm, rather than an air-incident optical recording medium comprising a coating system less than 1 μm thick on the recording layer, as recited in claim 25. While Lee refers to the fact that an optical disk may be used with the disclosed optical flying head, Lee is completely silent with respect to specific features of the optical disk and, in particular, with respect to any discussion of layers or the thermal conductivity thereof. Therefore, no combination of Rosen and Lee teaches or suggests an air-incident optical recording medium comprising a coating system less than 1 μm thick on a recording layer, between the recording layer and a flying optical head, the coating system having at least one layer whose thermal conductivity prevents a surface temperature from occurring

when the recording layer is heated by the optical beam which can cause evaporation of molecules adsorbed therein from an ambient atmosphere, as recited in claim 25.

In view of the foregoing, it is respectfully asserted that claim 25 patentably distinguishes over any combination of Rosen and Lee, such that the rejection of claim 25 under 35 U.S.C. §103(a) as being obvious over Rosen in view of Lee should be withdrawn.

Claims 26-31 depend from claim 25 and are patentable over Rosen and Lee for at least the same reasons.

Conclusion

In view of the foregoing amendments and remarks, this application should be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to deposit account No. 23/2825.

Respectfully submitted,
Guolin Ma et al., Applicant

By: Gary S. Engelson

Gary S. Engelson, Reg. No. 35,128
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2211
Tel. No.: (617) 720-3500
Attorney for Applicant

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Version with Markings to Show Changes Made

In the Specification:

The paragraph beginning at line 18 of page 1 has been amended as follows:

Conventional flying optical heads, for example as disclosed in the above-mentioned patents, use specially designed "air-incident disks" that relocate the optically sensitive information-carrying layer from a position below a thick, transparent, protective substrate [(See Fig. 1)] to a position very near the lowest facet of the lens facing the disk (See Fig. 2). A hard coating is usually used as the top-most layer, between the information-carrying layer and the lens, to improve head-disk reliability. Appropriately chosen lubrication film and adhesion layers are also sometimes used.

The paragraph beginning at line 16 of page 3 has been amended as follows:

According to [a] another embodiment of the invention, there is an optical disk designed to be used with flying optical heads, comprising: a protective overcoat layer; a first dielectric layer; a phase change recording layer where the reflectivity difference between the amorphous and crystalline states are utilized for mark formation; a second dielectric layer; and a metal reflector layer; wherein the layers are supported on a substrate for mechanical support; and when the phase change recording layer experiences a temperature sufficient to cause transformation to an amorphous state, a surface of the disk on which optical energy impinges experiences a temperature such that no significant evaporation of the protective overcoat layer and no significant evaporation of adsorbed molecules from ambient atmosphere occur. In this embodiment, the structure keeps the surface temperature less than the desorption temperature of water during read and write operations. The protective overcoat layer can be designed to have low thermal conductivity to further isolate the heat generated by the making and erasing operations by an optical beam or can be designed to have high thermal conductivity to quickly dissipate the transmitted heat over a wide area. Alternatively, the structure keeps the surface temperature less than the desorption temperature of common hydrocarbon species found in

ambient air during read and write operations. The protective overcoat layer may comprise a solid-phase overcoat and a lubricant. Alternatively, the protective overcoat layer may itself be a lubricant. A third dielectric layer can be added between the metal reflector layer and the substrate. A thermal isolation layer having a thermal conductivity less than that of the first dielectric layer can be added between the protective overcoat and the first dielectric layer. In variations of this embodiment, the separation between the recording layer and the overcoat layer can be in the range of 100-500 nm. The total optical thickness between the recording layer and the surface of the disk can be greater than the optical thickness required to achieve the first maximum in reflectivity difference between the amorphous and the crystalline states of the phase change recording material.

The paragraph beginning at line 10 of page 6 has been amended as follows:

In air-incident optical recording, the active layer is brought as close to the surface of the disk facing the lens as possible, with only a few, thin intervening layers to improve the head-disk interface and to satisfy optical requirements. Figs. 2A and 2B schematically represent [a] conventional air-incident disk structures 200 used with flying optical heads 201, 202. Both single-lens element flying heads 202 and SIL-type doublet supported by a slider body 201 are shown. Since the combined thickness of the overcoat 203 and the upper dielectric 204 is normally less than 1 micron, thermal events at the active layer 205 can strongly affect the surface 206 of the overcoat 203 and the lens 207, 208. This is especially true when SIL-type doublet is used, as the separation between the bottom facet 209 of the SIL lens 207 and the top 206 of the overcoat 203 is much less than 1 micron. Furthermore, a lubrication layer (not shown) is often used to improve head-disk reliability. Elevation of the surface temperature can have undesirable effects on the lubrication properties and causes evaporation of some lubricant. Also, any airborne contaminant including moisture present in the ambient atmosphere, which may have been adsorbed into the surface of the disk, may be evaporated. These effects are described in further detail, now.

The paragraph beginning at line 20 of page 8 has been amended as follows:

As can be expected, the thicker the combined thickness of upper dielectric and the overcoat, the better their thermal isolation properties. Since the overcoat layer's primary function is to produce a reliable head-disk interface, they may not necessarily have the desirable thermal isolation properties needed to ensure a low surface temperature. It is therefore advantageous to utilize the upper cladding layer, whose required material properties are to be low loss and compatible with the active layer, to perform the task of thermal isolation. In this manner, the overcoat species and thicknesses can be chosen purely for its head-disk interface contributions. However, one can also take advantage of the different material characteristics of the upper cladding versus the overcoat. For example, diamond-like carbon or other forms of carbon are widely used in magnetic disks as lubricants. Such layers typically have a high thermal conductivity. Although they will not contribute to thermal insulation, these layers can be used advantageously to dissipate the heat that is allowed to [passed] pass through the insulating upper cladding, leading to lower heat energy per unit area on the surface of the disk immediately underneath the lens.

In the Claims:

Claims 13 and 21-23 have been amended as follows:

13. (Twice Amended) The optical disk of claim 11 such that the protective overcoat layer has a thermal conductivity that [substantially] dissipates heat that reaches the surface when optical energy impinges on the recording layer.

21. (Twice Amended) An optical recording system comprising: [of]

an air-incident optical disk compatible with flying optical heads, in which [the] a recording layer is separated from a surface of the disk by intervening layers of a total thickness less than about 1 μm and a composition such that the highest temperature of the surface during normal operation is less than the desorption temperature of water;

a flying optical head where the lowest facet of the lens element of the flying optical head is supported to float in close proximity to the surface of the disk and where the optical focus of the flying head is at the recording layer;

means of delivering a beam of light to the optical head so as to raise the recording layer to a temperature exceeding about 250°C;

means of optically detecting and differentiating the presence and absence of the mark as seen by the optical beam; and

tracking detection and feedback means to ensure that the optical beam can follow the path of the marks.

22. (Amended) The system of claim 21 where the air-incident disk uses <u>a</u> phase change recording layer.

23. (Amended) The system of claim 21 where the flying optical head [comprise of] <u>comprises</u> a solid immersion lens element having a spherical surface and substantially flat surface facing the disk.